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# एडिफेनफोस तकनीकी — विशिष्टि

( पहला पुनरीक्षण )

## Edifenphos Technical — Specification

( First Revision )

ICS 65.100.30

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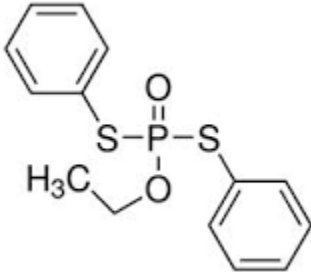
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## FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Pesticides Sectional Committee had been approved by the Food and Agriculture Divisional Council.

Edifenphos is a fungicide and its formulations are used on agricultural crops.

Edifenphos is the accepted common name by the International Organisation for Standardization (ISO) for the pesticidal chemical *O*-ethyl-*S*, *S*-diphenyl phosphorodithioate. The empirical and structural formulae and molecular mass of Edifenphos are given below:

<i>Empirical Formula</i>	<i>Structural Formula</i>	<i>Molecular Mass</i>
$C_{14}H_{15}O_2PS_2$		310.0

This standard was first published in 1978. In this revision, the standard has been brought out in the latest style and format of the Indian Standards. It also incorporates four amendments issued to this standard.

In the preparation of this standard due consideration has been given to the provisions of the *Insecticides Act*, 1968 and the Rules framed thereunder. However, this standard is subject to the restrictions imposed under these, wherever applicable.

The composition of the committee responsible for the formulation of this standard is listed in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard*

# EDIFENPHOS TECHNICAL —

## SPECIFICATION

( *First Revision* )

**1 SCOPE**

**1.1** This standard prescribes the requirements and the methods of sampling and test for Edifenphos, technical.

**2 REFERENCES**

The standards, listed below contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below:

<i>IS No.</i>	<i>Title</i>
IS 1070 : 1992	Reagent grade water — Specification ( <i>third revision</i> )
IS 6940 : 1982	Methods of test for pesticides and their formulations ( <i>first revision</i> )
IS 8190 (Part 2) : 1988	Requirements for packing of pesticides: Part 2 Liquid pesticides ( <i>second revision</i> )
IS 10946 : 1996	Methods of sampling for technical grade pesticides

**3 REQUIREMENTS****3.1 Description**

The material shall be pale yellow to light brown clear liquid free from extraneous matter.

**3.2** The material shall also comply with the requirements given in Table 1.

**4 PACKING**

**4.1** The material shall be packed in clean and dry containers made of mild steel adequately and suitably lacquered from inside. Aluminium containers may also be used. The containers shall also comply with the general requirements as stipulated in 2 of IS 8190 (Part 2).

**5 MARKING**

**5.1** The containers shall be securely closed and shall bear legibly and indelibly the following information:

- a) Name of the material;
- b) Name and address of the manufacturer;
- c) Batch number;
- d) Date of manufacture;
- e) Date of expiry;
- f) Net quantity;
- g) Nominal edifenphos content, percent (*m/m*);
- h) Cautionary notice as worded in the *Insecticides Act*, 1968, and Rules framed thereunder; and
- j) Any other information required under the *Legal Metrology (Packaged Commodities) Rules*, 2011.

**5.2 BIS Certification Marking**

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

**Table 1 Requirements for Edifenphos Technical**  
(*Clauses 3.2*)

Sl No.	Characteristic	Requirement	Method of Test, Refer to
(1)	(2)	(3)	(4)
i)	Edifenphos content, percent by mass	85.0	Annex A
ii)	Material insoluble in acetone, percent by mass, <i>Max</i>	0.5	IS 6940
iii)	Moisture content, percent by mass, <i>Max</i>	0.5	IS 6940
iv)	Acidity (as H <sub>2</sub> SO <sub>4</sub> ) percent by mass, <i>Max</i>	1.0	IS 6940
v)	Specific gravity at 27 °C/27 °C	1.22 to 1.26	IS 6940

## **6 SAMPLING**

**6.1** Representative samples of the material shall be drawn according to IS 10946

## **7 TESTS**

**7.1** Tests shall be carried out by the methods referred to in col (4) of Table 1.

## **7.2 Quality of Reagents**

Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

**ANNEX A**  
[Table 1, Sl No. (i)]

**DETERMINATION OF EDIFENPHOS CONTENT**

**A-1 GENERAL**

**A-1.1** Either of the two methods, namely, gas chromatographic method or iodine method may be used for determination of Edifenphos content. However, in case of dispute, gas chromatographic method shall be the referee method.

**A-2 GAS CHROMATOGRAPHIC METHOD**

**A-2.1 Principle of the Method**

The method consists of injecting a sample with an internal standard in a known proportion into a gas chromatograph and determining the area under peak. The area under the peak is proportional to the mass of the sample. By comparison of this area with that of the standard, the percentage purity of the sample is determined.

**A-2.2 Apparatus**

**A-2.2.1 Gas Liquid Chromatograph (GLC)** — Equipped with a flame ionization detector (FID) and coupled to a printer plotter-cum-integrator.

Detector temperature	300 °C
Injection temperature	250 °C
Oven temperature	195 °C
Carrier gas flow rate (N <sub>2</sub> ), ml/min	30
Hydrogen, ml/min	30
Air, ml/min	300
Attenuation	2 ↑ 9

**A-2.2.2 Column** — Consisting of 180 cm glass tubing of 4.0 mm outer diameter packed with 2 percent OV-101 on Gaschrome Q 100 Mesh to 120 Mesh.

**A-2.2.3 Micro Syringe** — 10 µl capacity.

**A-2.3 Reagents**

**A-2.3.1 Acetone AR Grade**

**A-2.3.2 Internal Standard Solution**

Diethyl adipate (DOA) free from any impurity likely to interfere with Edifenphos under the chromatographic conditions.

**A-2.3.3 Standard Reference Edifenphos** — Edifenphos standard of known purity.

**A-2.4 Procedure**

**A-2.4.1 Preparation of Internal Standard**

Dissolve 1.2 g of diethyl adipate in 100 ml of acetone.

**A-2.4.2 Preparation of Sample Solution**

Weigh a sample containing about 0.25 g of Edifenphos in 25 ml volumetric flask and add to it 20 ml of the internal standard solution. Dilute up to the mark with acetone and shake well to homogenize.

**A-2.4.3 Preparation of Standard Solution**

Weigh accurately about 0.25 g of Edifenphos standard of known purity in 25 ml volumetric flask and add to it 20 ml of 1.2 percent Diethyl adipate (DOA) in acetone solution and dilute up to the mark with acetone and shake well to homogenize.

**A-2.4.4 Analysis of Sample**

Inject 3 µl of standard solution (*see A-2.4.3*) and sample solution (*see A-2.4.2*) to GLC column set up at the prescribed operating conditions (*see A-2.2.1*) and record the GLC charts. Obtain the peak area ratios of Edifenphos, namely diethyl adipate from the GLC charts of the Edifenphos reference standard solution (*see A-2.4.3*) and sample solution (*see A-2.4.2*).

**A-2.5 Calculation**

Edifenphos content, percent by mass =

$$\frac{A_3 \times A_2 \times M_1 \times P}{A_4 \times A_1 \times M_2}$$

where

$A_1$  = area of the Edifenphos peak in the standard solution;

$A_2$  = area of the Edifenphos peak in the sample solution;

$A_3$  = area of the internal standard peak in the standard solution;

$A_4$  = area of the internal standard peak in the sample solution;

$M_1$  = mass, in g, of the Edifenphos standard (**A-2.4.3**);

$M_2$  = mass, in g, of the sample taken for the test (**A-2.4.2**); and

$P$  = percentage purity of the Edifenphos standard

### A-3 IODOMETRIC METHOD

#### A-3.1 Reagent

**A-3.1.1** *Standard Sulphuric Acid* — 3 N to 4 N.

**A-3.1.2** *Sodium Hydrogen Carbonate*

**A-3.1.3** *Sodium Hydroxide Pellets*

**A-3.1.4** *Standard Iodine* — 0.1 N

**A-3.1.5** *Phenolphthalein Indicator Solution* —

0.1 percent.

**A-3.1.6** *Ethanol*

**A-3.1.7** *Starch* — 1 percent

**A-3.1.8** *Standard Sodium Thiosulphate* — 0.1 N

#### A-3.2 Determination of Total Thiophenol Content

Weigh accurately about 0.5 g of the sample into a 250 ml three neck round bottom flask with ground glass joint and dissolve it in 30 ml ethyl alcohol. Add 20 ml distilled water and 5 g of sodium hydroxide pellets. Heat the mixture to reflux on a heating mantle using a water condenser in an atmosphere of nitrogen for 4 h. Add few millilitres of ethyl alcohol, if required. After reflux wash the condenser with 10 ml of ethyl alcohol. Cool the reaction mixture to room temperature and transfer quantitatively to a 250 ml volumetric flask using 80 ml of ethyl alcohol. Make up to the mark with distilled water. Shake well to homogenize the solution. Pipette out 50 ml of solution into a 250 ml B 24 joint conical flask. Add 2 to 3 drops of phenolphthalein indicator and acidify with 3 N to 4 N sulphuric acid. If the solution turns milky add ethyl alcohol until the solution becomes clear. Add a pinch of sodium hydrogen carbonate to confirm that the solution is acidic. Add 20 ml of standard 0.1 N iodine solution

and titrate against standard 0.1 N sodium thiosulphate solution using starch solution as an indicator. The end point is blue to colourless.

**A-3.2.1** Carry out the blank titration for 20 ml of iodine solution.

#### A-3.2.2 Determination of Free Thiophenol Content

Weigh accurately about 0.5 g of the sample into a 250 ml stoppered conical flask and dilute it with 40 ml of ice cooled ethyl alcohol. Add 20 ml of ice cooled distilled water, 5 ml of 3 N to 4 N sulphuric acid and a pinch of sodium hydrogen carbonate. Titrate it immediately against 0.1 N standard Iodine solution. The end point is the appearance of blue colour.

#### A-3.3 Calculation

Ediphenphos content, percent ( $m/m$ )

$$= \frac{5(V_0 - V_1)}{M} \times \frac{V_2}{m} \times 15.52 \times N$$

where

$V_0$  = volume, in ml, of standard 0.1N sodium thiosulphate solution required for 20 ml of iodine solution (*see A-3.2.1*);

$V_1$  = volume in ml, of standard 0.1 N sodium thiosulphate solution required for the estimation of total thiophenol content (*see A-3.2*)

$V_2$  = volume in ml, of standard 0.1 N iodine solution consumed for free thiophenol equivalent to standard 0.1 N sodium thiosulphate solution (*see A-3.2.2*);

$M$  = mass, in g, of the sample taken for the estimation of the total thiophenol content;

$m$  = mass, in g, of the sample taken for the estimation of free thiophenol content; and

$N$  = normality of standard 0.1 N sodium thiosulphate solution.

**ANNEX B**  
(Foreword)

**COMMITTEE COMPOSITION**  
Pesticides Sectional Committee, FAD 01

<i>Organization</i>	<i>Representative(s)</i>
Directorate of Plant Protection Quarantine and Storage, Faridabad	DR RAVI PRAKASH ( <b>Chairperson</b> )
All India Biotech Association, New Delhi	SHRI SAURABH SINGHAL SHRI SHAH JI DHAR ( <i>Alternate</i> )
Central Insecticide Board and Registration Committee, Faridabad	SECRETARY DR VANDANA SETH ( <i>Alternate</i> )
Central Insecticide Laboratory, Faridabad	DR ARCHANA SINHA SHRI SUBHASH CHAUDHARY ( <i>Alternate</i> )
Consumer Guidance Society of India, Mumbai	SHRI SITARAM DIXIT DR M. S. KAMATH ( <i>Alternate</i> )
Crop Care Federation of India, New Delhi	DR J. C. MAJUMDAR
Crop Life India, New Delhi	SHRI ASITAVA SEN MS NIRUPAMA SHARMA ( <i>Alternate</i> )
CSIR-Indian Institute of Toxicology Research, Lucknow	DR SHEELENDRA P. SINGH
Food Safety and Standards Authority of India, New Delhi	ADVISOR (STANDARDS)
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Indian Institute of Packaging, Mumbai	DR TANWEER ALAM
Indian Pest Control Association, New Delhi	SHRI UDAYAN GHOSH
Institute of Pesticide Formulation Technology, Gurgaon	DR M. VAIRAMANI
Ministry of Agriculture, Department of Agriculture, Chennai	JOINT DIRECTOR OF AGRICULTURE (RES) DEPUTY DIRECTOR LAB ( <i>Alternate</i> )
National Centre for Integrated Pest Management, New Delhi	DR SUMITRA ARORA
National Institute of Plant Health Management, Hyderabad	DR MAHESH SAINI MS T. SRIDEVI ( <i>Alternate</i> )
Pesticide Manufactures and Formulators Association of India (PMFAI), Mumbai	DR ARCHANA SRIVASTAVA DR UDAY KUMAR ( <i>Alternate</i> )
Regional Pesticides Testing Laboratory, Chandigarh	SHRI V. VASU
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*Member Secretary*  
SHRI KULDEEP MITTAL  
SCIENTIST 'B'/ASSISTANT DIRECTOR  
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### Amendments Issued Since Publication

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